

Case of Severe Serous Fat Atrophy

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A 21-year-old man with a history of hemochromatosis and chronic heart failure presented with a 6-month history of weight loss (13.5 kg), fatigue, and generalized weakness. On physical examination, he appeared older than stated age, had cachexia with temporal wasting, and was unable to get up from a sitting position. Laboratory test results were as follows: hemoglobin, 10.7 g/dL; hematocrit, 30.2%; red blood cells, $3.13 \times 10^{12}/L$; white blood cell count, $2.9 \times 10^9/L$; total iron-binding capacity, 190 $\mu g/dL$; iron, 75 $\mu g/dL$; ferritin, 306 $\mu g/L$; alanine aminotransferase, 77 U/L; aspartate aminotransferase, 40 U/L; and alkaline phosphatase, 32 U/L. The peripheral blood smear was unremarkable (not shown). Subsequent bone marrow biopsy showed marked hypocellularity and gelatinous stromal transformation, consistent with advanced serous fat atrophy. The gelatinous substance stained strongly with alcian blue at a pH of 2.5.

Serous fat atrophy (gelatinous bone marrow transformation) is a rare condition that presents with weight loss and anemia.¹ Although the pathogenesis is unknown, serous fat atrophy has been associated with acute febrile states, AIDS,

alcoholism, anorexia nervosa, cachexia, carcinomas, chronic heart failure, and lymphoma.¹⁻³ Serous fat atrophy has an adult male predominance, with maximal severity in men aged 20 to 29 years.¹ Bone marrow changes are characterized by fat cell atrophy, focal to diffuse loss of hematopoietic cells, and deposition of extracellular mucopolysaccharides rich in hyaluronic acid, without reticulin fibers.^{1,4} The mucopolysaccharide gelatinous material is confirmed by strong alcian blue staining at a pH of 2.5.⁵ The bone marrow changes can be reversed by treating the associated condition.³

1. Böhm J. Gelatinous transformation of the bone marrow: the spectrum of underlying diseases. *Am J Surg Pathol*. 2000; Jan;24(1):56-65.
2. Delacrétaz F, Perey L, Schmidt PM, Chave JP, Costa J. Histopathology of bone marrow in human immunodeficiency virus infection. *Virchows Arch A Pathol Anat Histopathol*. 1987;411(6):543-551.
3. Tavassoli M, Eastlund DT, Yam LT, Neiman RS, Finkel H. Gelatinous transformation of bone marrow in prolonged self-induced starvation. *Scand J Haematol*. 1976;16(4):311-319.
4. Seaman JP, Kjeldsberg CR, Linker A. Gelatinous transformation of the bone marrow. *Hum Pathol*. 1978;9(6):685-692.
5. Clarke BE, Brown DJ, Xipell JM. Gelatinous transformation of the bone marrow. *Pathology*. 1983;15(1):85-88.

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